What is claimed is:

1. A method for passively determining wheel lift of a wheel of an automotive vehicle comprising:
    providing an operating input torque to the wheel;
    determining the operating input torque to the
5   wheel;
    determining a rotational speed of the wheel;
    determining a wheel response to the operating input torque; and
    determining a wheel lift condition as a function
10 of the operating input torque, the rotational speed of the wheel and the wheel response.

2. A method as recited in claim 1 wherein determining a wheel response comprises determining a wheel slip rate for the wheel.

15 3. A method as recited in claim 2 wherein determining a wheel lift condition comprises determining a wheel lift condition in response to comparing the wheel slip rate to a slip rate threshold.

20 4. A method as recited in claim 3 wherein the slip rate threshold is a function of the operating wheel torque.

5. A method as recited in claim 3 further comprising determining a slip ratio in response to the
25 rotational speed of the wheel and wherein determining

25

a wheel response further comprises determining a wheel response comprises determining a sign of the slip ratio and a sign of the slip rate and wherein determining a wheel lift condition comprises

5   determining a wheel lift condition as a function of the sign of the slip ratio and the sign of the slip rate.

6.   A method as recited in claim 1 wherein determining a wheel response comprises determining a

10   wheel acceleration.

7.   A method as recited in claim 6 wherein determining a wheel lift condition comprises determining a wheel lift condition in response to comparing the wheel acceleration to a wheel

15   acceleration threshold.

8.   A method as recited in claim 7 wherein the acceleration threshold is a function of the operating wheel torque.

9.   A method as recited in claim 6 further

20   comprising determining a slip ratio in response to the rotational speed of the wheel, wherein determining a wheel response further comprises determining a sign of the slip ratio and a sign of the wheel acceleration and wherein determining a wheel lift condition

25   comprises determining a wheel lift condition as a function of the sign of the slip ratio and the sign of the wheel acceleration.

10. A method as recited in claim 1 wherein determining a wheel response comprises determining a wheel slip ratio for the wheel and a wheel acceleration.

11. A method as recited in claim 10 wherein determining a wheel lift condition comprises determining a wheel lift condition in response to comparing the wheel acceleration to a wheel acceleration threshold and comparing the wheel slip rate to a slip rate threshold.

12. A method as recited in claim 7 wherein the acceleration threshold and the slip rate threshold are a function of the operating input torque.

13. A method as recited in claim 1 further comprising determining a sign of the operating torque, determining a sign of the wheel slip ratio and determining a sign of the wheel acceleration, wherein determining a wheel lift condition comprises comparing the sign of the operating torque to the sign of the wheel slip ratio and the sign of the wheel acceleration.

14. A method as recited in claim 1 wherein determining a wheel lift condition comprises generating a possible wheel lift signal, a possibly grounded signal, a wheel grounded signal, a wheel lifted signal.

15. A method as recited in claim 1 further comprising determining a slip rate for the wheel, a wheel acceleration and a slip ratio wherein determining a wheel lift condition in response to the input torque, the rotational speed and the wheel response comprises determining a wheel lift condition in response to the input torque, the wheel acceleration, wheel slip ratio and wheel slip rate.

16. A method as recited in claim 1 further comprising repeating determining the operating input torque to the wheel, determining a rotational speed of the wheel, determining a wheel response to the operating input torque, determining a wheel lift for a predetermined number of cycles, and when the wheel lift condition is determined a predetermined number of times, generating a wheel lifted signal.

17. A method for passively determining wheel lift of a wheel of an automotive vehicle comprising:
    providing an operating input torque to the wheel;
    determining a magnitude of the operating input torque to the wheel;
    determining a wheel response to the operating input torque; and
    generating a wheel lift signal and a wheel grounded signal as a function of the magnitude of the operating input torque and the wheel response.

18. A method as recited in claim 17 wherein determining a wheel response comprises determining a wheel slip rate for the wheel.

19. A method as recited in claim 18 wherein determining a wheel lift condition comprises determining a wheel lift condition in response to comparing the wheel slip rate to a slip rate threshold.

20. A method as recited in claim 18 further comprising determining a slip ratio in response to a rotational speed of the wheel and wherein determining a wheel response further comprises determining a wheel response comprises determining a sign of the slip ratio and a sign of the slip rate and wherein generating a wheel lift signal comprises generating a wheel lift signal as a function of the sign of the slip ratio and the sign of the slip rate.

21. A method as recited in claim 17 wherein determining a wheel response comprises determining a wheel acceleration.

22. A method as recited in claim 21 wherein generating a wheel lift signal comprises generating a wheel lift signal in response to comparing the wheel acceleration to a wheel acceleration threshold.

23. A method for passively determining wheel lift of a wheel of an automotive vehicle comprising:
    applying an operating input torque to a wheel;
    passively determining an input torque magnitude and input torque direction;
    determining wheel slip for the wheel;

determining a wheel response to the operating input torque;

determining a wheel response threshold in response to the operating input torque;

5 comparing the wheel response to the wheel response threshold; and

generating a wheel lifted signal or wheel grounded signal in response to the operating input torque, the wheel slip and comparing the wheel

10 response.

24. A method as recited in claim 23 wherein indicating comprises indicating a possibly lifted signal or possibly grounded signal.

25. A method as recited in claim 23 wherein the

15 wheel response comprises a wheel slip rate and the wheel response threshold comprises a wheel slip rate threshold.

26. A method as recited in claim 23 wherein the wheel response comprises wheel acceleration and the

20 wheel response threshold comprises a wheel acceleration threshold.

27. A method as recited in claim 23 wherein the wheel response comprises a wheel slip rate and wheel acceleration.

25 28. A method for passively determining wheel lift of a wheel of an automotive vehicle comprising the steps of:

applying an operating input torque to a wheel;

passively determining an input torque magnitude and input torque direction;

determining a wheel slip in response to the operating input torque;

determining a wheel slip threshold in response to the operating input torque;

comparing the wheel slip to the wheel slip threshold;

generating a wheel lifted signal when the wheel slip is above the wheel response threshold, the input torque magnitude is high and the and the wheel slip is diverging; and

when the input torque magnitude is large, the wheel slip is near zero, generating a grounded wheel signal.

29. A method as recited in claim 28 further comprising when the input torque is near zero and the wheel slip is converging, generating a grounded wheel signal.

30. A method as recited in claim 28 further comprising when the input torque is near zero and the wheel slip is non-convergent, generating a wheel lift signal.

31. A method as recited in claim 28 wherein wheel slip comprises a wheel slip rate.

32. A method as recited in claim 28 wherein wheel slip comprises a slip ratio.

33. A method as recited in claim 28 further comprising determining a wheel acceleration in response to the operating input torque;

determining a wheel acceleration threshold in response to the operating input torque;

comparing the wheel acceleration to the wheel acceleration threshold; and

generating a wheel lifted signal when the wheel acceleration is above the wheel acceleration threshold, the wheel slip is above the wheel slip threshold, the input torque magnitude is high and the and the wheel slip and acceleration are diverging.

34. A system for detecting lift of a wheel of an automotive vehicle comprising:

a speed sensor coupled to the wheel producing a wheel speed signal;

a torque control system coupled to the wheel for generating an operating input torque to the wheel; and

a controller coupled to the said torque control system and the wheel speed sensor, said controller determining a wheel response to the operating input torque, said controller generating a wheel lift signal as a function of the operating input torque, the wheel speed signal and the wheel response.

35. A system as recited in claim 34 further comprising a yaw rate sensor generating a yaw rate signal, said slip ratio being a function of the yaw rate signal.

36.   A system as recited in claim 34 wherein the wheel response comprises a wheel slip ratio.

37.   A system as recited in claim 34 wherein the wheel response comprises a wheel acceleration.

5   38.   A system as recited in claim 34 wherein the wheel response comprises a wheel slip rate.